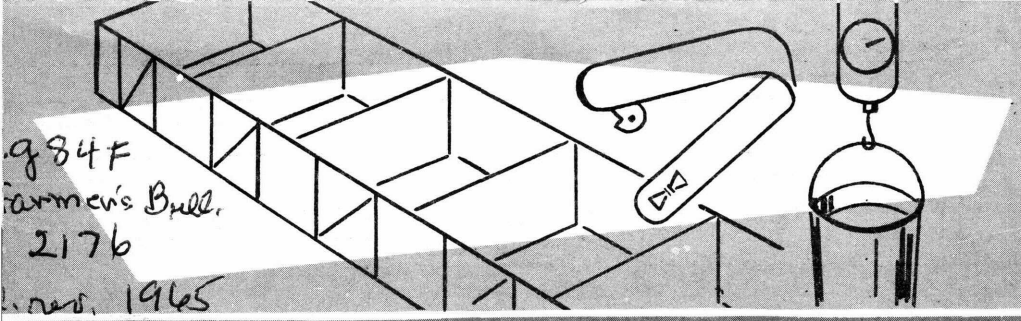


Raising Dairy Calves and Heifers

Farmers' Bulletin No. 2176

U.S. DEPARTMENT OF AGRICULTURE

CONTENTS

Raising Dairy Calves and Heifers

Profitable dairy herds need good heifers as replacement animals. Twenty-five percent of the cows in an average herd need to be replaced each year because they no longer return a profit. If you allow for losses among young animals, you need 3 or 4 heifer calves per year for each 10 cows in the herd.

To have good dairy replacements, you must have good breeding stock. Each herd sire and each cow should be selected for its ability to transmit high levels of milk production.

You must also provide proper feed and management for the calves so they can develop the desirable performance traits inherited from their parents.

Feeding for growth and development of the dairy calf begins before it is born. The calf's dam should be in good flesh at calving time. She should be dried off 6 to 8 weeks before the excepted calving date.

During the dry period, feed her all the good hay or silage, either separately or together, that she will eat plus 3 to 6 pounds of a concentrate mixture containing 11 to 14 percent of protein.

Cows fed inadequate or unbalanced rations have small or weak calves. These calves are often difficult to raise. Strong, vigorous calves are easier to raise.

CARE OF FRESHENING COWS

The gestation period for cows is about 280 days. If you know the breeding date, you can dry the cow off at the proper time and provide care for her and the calf.

Several days before the calf is due, separate the cow from the rest of the herd and place her in calving quarters.

During cold weather, this should be a roomy, well-bedded box stall. Clean and disinfect the stall and put clean, dry bedding in it.

In warm weather, a small, well-grassed plot or pasture, free from trash or manure and close to the barn, makes a good calving place.

The first indication of approaching calving are a pronounced swelling and enlarging of the vulva and a dropping away or sinking on either side of the tail setting. When these signs are noted, the cow should not be disturbed. Observe her from time to time.

If everything is progressing normally, she usually will give birth to her calf without any assistance. Proper assistance should be given to the cow or to the calf if it is required. Such assistance may prevent the loss of a calf. If the cow has undue difficulty in giving birth to the calf, the services of a veterinarian may be required.

CARE OF THE CALF

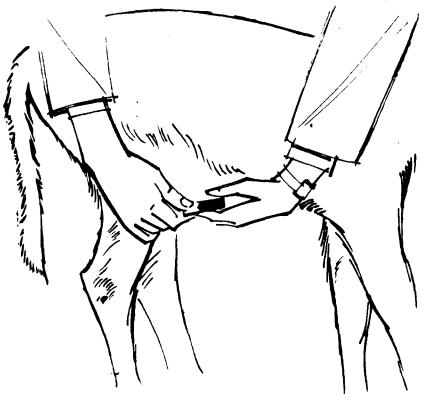
Early Management

As soon as the calf is dropped, remove any mucus from its mouth and nostrils. If the calf does not start breathing immediately, apply artificial respiration. Rhythmically compress and release the chest walls with your hands or rhythmically slap the calf's chest.

The cow will usually begin to lick the calf immediately after birth. This helps dry off the calf and aids in stimulating breathing and circulation. In very cold weather or when the cow fails to lick the calf, rub and dry it with a dry cloth or feed sack.

Paint the calf's navel with iodine or dust it with a sulfa, antibiotic, or boric acid powder. This helps prevent infection.

If the cow's teats and udder are dirty, wash them thoroughly with soap and water; then, dry them before the calf is allowed to nurse. Keep the stall clean and well bedded while the cow and calf are in it.



The calf should be marked and identified at this time. Different methods of marking calves are explained on page 17.

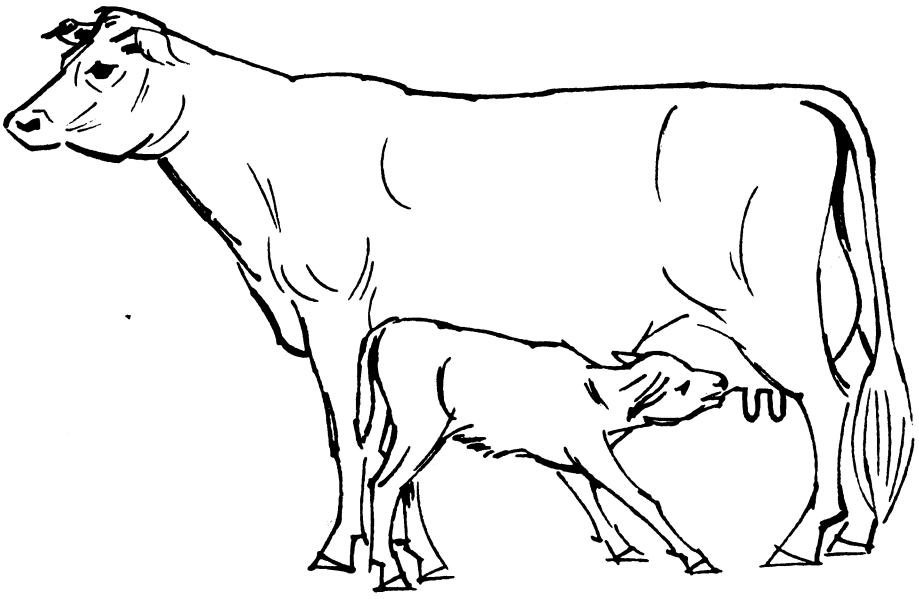
Early Feeding

A normal, vigorous calf will be standing and attempting to nurse within 1 hour after birth. Help any calves that are too weak to nurse.

The calf needs colostrum—the first milk—from its mother. Colostrum contains antibodies, or substances that protect the calf from infection. It also provides protein, vitamins—especially vitamin A, which the calf needs at this time—and laxative material. You can feed any extra colostrum to older calves in the herd or you can freeze and store it for several months. Colostrum can replace milk or milk substitutes pound for pound.

The calf should be taken from its mother when 12 to 18 hours old. Separating them at this time reduces the chances of the calf's overeating or acquiring infection and contamination from the place of birth. It is much easier to teach the calf to drink at this age. Also, the cow will not "worry" as much after an early separation as she would later and will respond better to milking.

The calf should be fed its mother's colostrum for at least 3 days. After the third day, feed whole milk. To teach it to drink from a



bucket, let the calf suck your fingers. Gradually lower its head into the bucket of warm colostrum or milk. After it has had several swallows, withdraw your fingers gradually. This process may have to be repeated.

It frequently is necessary to back the calf in a corner and straddle its neck. With extremely difficult calves, you may find it easier to skip one feeding before attempting to teach the calf to drink.

Most calves need to be fed only twice a day. Small, weak calves may need three feedings for the first week.

Feed 8 pounds per day to Holstein or similar-sized calves and 6 pounds per day to Jersey-sized calves.

Nipple buckets can be used for young calves. However, they are difficult to keep clean and older calves can pull the nipple from the bucket and spill the milk.

Feeding with dirty and unwashed utensils can result in scours and other digestive disturbances. After each feeding, thoroughly wash and scald the utensils, or rinse them with a chlorine solution. Then, place them on a rack to drain and dry.

Calves grow best if fed at a regular time each day.

The milk fed should not come from cows having a communicable disease such as TB, Bangs disease, or severe mastitis.

Keep calf pens clean, well bedded, and dry. Any hay, grain, or silage not eaten should be removed each day.

Feeding to 3 Months of Age

Careful feeding during the first 20 days is important. During this time, it is better to slightly underfeed the calf than to feed it too much. A young calf's digestive system is easily upset. After they are 20 days old, vigorous, healthy calves can be fed more than the suggested amounts.

After the calf is 5 to 7 days old and has received a good start on colostrum and whole milk, it will grow and develop well on a number of different feeds if their quality is good and feeding conditions are carefully controlled. The feed you should use depends on individual experience, rate of gain desired, and costs.

The two most practical feeds are limited amounts of whole milk or a commercial milk replacer. With either of these feeds, give the calf a palatable grain mix or a commercial calf starter. Encourage it to eat this dry feed at an early age. Milk or milk replacer is usually not fed after 4 to 6 weeks of age.

If you feed this way, bucket feeding is eliminated as soon as practicable. The suggested amount of milk or replacer to feed to young calves is given in table 1.

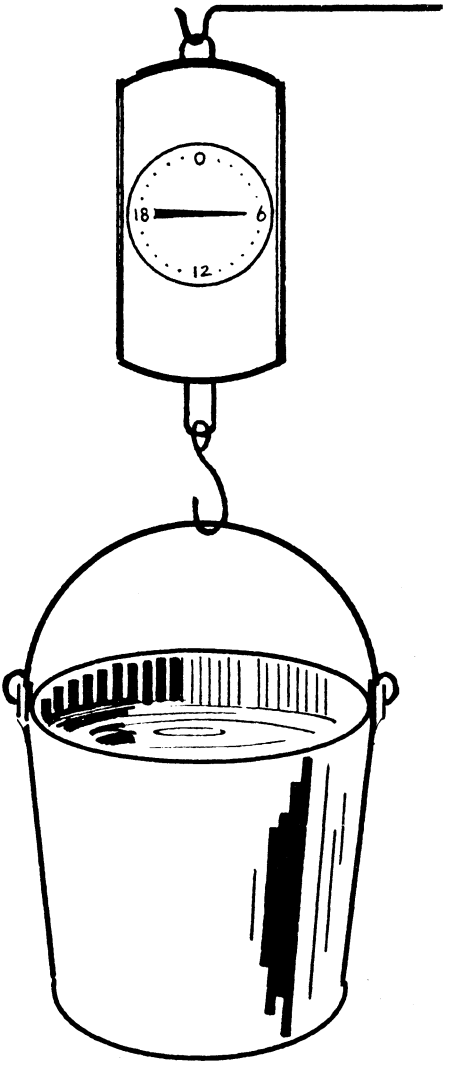


TABLE 1.—*Suggested daily feeding schedule for young calves*

Age in days	Whole milk		Milk replacer[1]		Grain	Hay	
	Breed size		Breed size[2]			Breed size	
	Large	Small	Large	Small		Large	Small
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
0 to 3	[3]8	[3]6	0	0	0	0	0
4 to 5	[4]8	[4]6	0	0	0	0	0
6 to 10	8	6	.9	.6	([5])	0	0
11 to 20	9	7	1.1	.7	.6	([5])	([5])
21 to 30	8	8	1.2	1.0	1.0	.4	.2
31 to 40	6	7	.9	.9	1.3	.7	.3
41 to 50	5	3	.5	.7	1.7	1.0	.6
51 to 60	2	4	.2	.5	2.2	1.4	.9
61 to 90	0	0	0	0	3.0	2.6	1.1

[1] Approximate amount of milk replacer by weight. This should be dissolved or suspended in the proper amount of warm water and fed, starting at 6 days of age.

[2] Large breeds include Holstein, Ayrshire, and Brown Swiss; small breeds include Jerseys and Guernseys.

[3] This must be colostrum.

[4] If colostrum is available, feed it during this period.

[5] Some offered, but amount eaten is usually very small.

In some areas, it is still economical to feed fresh skimmed milk, fresh or pasteurized buttermilk, or whey after the calves are 10 days old. These feeds are used less now than they formerly were. Today, milk byproducts are dried and combined as the main ingredients in commercial milk replacers.

The cost of whole milk when fed at the rate suggested in table 1 is $16 to $22. The cost of the replacer, fed at the same rate, is $6 to $7.

With the Whole-Milk System

If you feed whole milk, the amount fed should be about 10 percent of the calf's body weight. During its first 2 weeks, no more than this amount should be fed to any calf. Small and weak calves sometimes do better if fed less. After 20 days of age, if a more rapid rate of growth is desired, the calf can be fed at the daily rate of 12 percent of its body weight. A more rapid rate of gain will result from the heavier feeding.

Calves will grow faster if fed more whole milk or if they are fed at the suggested rate for a longer time than indicated in table 1. However, at 1 to 2 years of age they will be about the same size as calves fed the recommended diet. Therefore, it usually does not pay to feed more whole milk than the amounts suggested in table 1 to calves that are grown as replacements.

Feed the milk at a temperature of 90° to 100° F. Accurately weigh or measure the amount you give each animal. For this purpose 1 pint weighs 1 pound.

Milk for calf feeding can come from herd cows giving milk that has the lowest butterfat percentage.

If a calf develops diarrhea, reduce the amount of milk fed by one-half for one or two feeds. Replace the milk with water so that you feed the same amount of liquid.

With the Milk-Replacer System

Most calves in this country are now raised on milk replacers. Usually a purchased, premixed replacer gives the best results. Or, you can purchase the ingredients and make a mix of your own choice.

Usually these products are diluted with warm water—1 part replacer to 9 or 10 parts water—just before being fed.

Manufacturers usually give the recommended levels of feeding on the container; follow these directions. Older vigorous calves can usually be fed a little more than the recommended levels for a fast growth rate.

Some commercial replacers have 10 to 20 percent of fat added. The added fat provides energy and makes the replacer resemble more closely the composition of whole milk.

The principal ingredients of milk replacers are dried milk by-products—60 to 90 percent. These may be dried skimmed milk, dried whey, dried whey products, or dried buttermilk.

Other ingredients frequently used are: Finely ground cereal flours, about 5 percent; dried brewers' yeast, 5 percent; distillers' solubles, 5 to 10 percent; and dextrose, 5 percent.

Less common ingredients are: Blood meal, 5 to 10 percent; soybean, fish, or similar meals, 5 percent; soybean flour, 19 to 30 percent; and apple pomace, 5 to 10 percent.

These products are low in certain vitamins and minerals. Vitamins A and D, trace minerals except copper, and antibiotics should always be added. Vitamin E and either limestone or calcium phosphate may sometimes be added.

With the Skim-Milk System

When skim milk is readily available, it can be fed in place of whole milk after the calf is about 20 days old. The substitution can be made abruptly, or over a period of 3 days.

After the calf is a month old, gradually increase the amount of skim milk fed from 10 to 20 pounds a day; the quantity to use depends on the size of the calf and the amount of skim milk available. You can stop feeding skim milk when the calf is 2 to 6 months old.

Skim milk should be fed while fresh and at a temperature of 90° to 100° F. Try to have the milk at nearly the same temperature at each feeding. If purchased, pasteurize skim milk before feeding it to calves. No matter where you obtain skim milk, make sure that it is from cows free of tuberculosis.

Because skim milk contains no vitamin A, calves fed it for long periods should be fed a vitamin A supplement. One or two teaspoons (no more) of cod liver oil per day, added to the milk at feeding time, will supply the needed amount. Omit the oil when the calf is eating 1 pound of good, leafy hay each day or is on good pasture.

When large quantities of skim milk are fed, a grain mixture containing 13 to 15 percent of protein is sufficient.

Fresh buttermilk or whey can be fed to calves the same way as fresh skim milk. These products should be pasteurized.

Feeding 3 to 9 Months of Age

Calves at 3 months of age are ready to eat the same feeds given to the dairy herd. However, because they grow rapidly, calves need some extra concentrate feeds. With good quality forage or pasture, they will continue to gain normally.

Feeding the Heifer

At 9 months of age calves can be considered heifers; they are still growing rapidly. Most young heifers grow well if given all the excellent hay that they will eat.

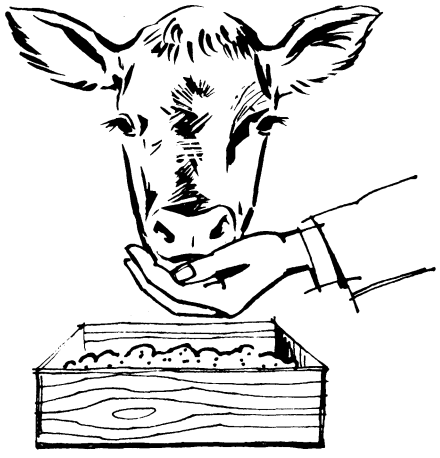
The amount of growth depends on the quality of the forage fed and how much the heifers eat. If you feed good-quality forage in unlimited amounts, no grain need be fed after the calf is 9 months old. The average daily feed consumption and the total amount of feed required to raise a calf from birth to 2 years of age is shown in table 2. Cost of feeds to raise a two-year-old heifer can be calculated by applying local feed costs.

TABLE 2.—*Average daily and total feed consumption of Holstein and Jersey calves*

Age in months	Holstein			Jersey		
	Milk	Grain	Hay	Milk	Grain	Hay
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1	8	0. 7	0. 3	7	0. 3	0. 2
2	4	1. 8	1. 1	5	1. 5	. 6
3	0	2. 8	2. 6	0	2. 5	1. 1
4	0	3. 0	4. 2	0	3. 0	2. 4
5	0	2. 0	6. 2	0	3. 0	3. 9
6	0	2. 0	7. 5	0	2. 0	6. 3
7	0	2. 0	9. 0	0	2. 0	6. 4
8	0	2. 0	10. 4	0	2. 0	6. 9
9	0	0	13. 2	0	0	8. 6
10	0	0	14. 9	0	0	10. 1
11	0	0	15. 9	0	0	10. 8
12	0	0	17. 4	0	0	11. 6
Total pounds to 1 year	360	518	3, 165	360	500	2, 123
13 to 15	0	0	18. 9	0	0	12. 9
15 to 17	0	0	20. 6	0	0	14. 0
17 to 19	0	0	22. 6	0	0	14. 5
19 to 21	0	0	23. 9	0	0	14. 7
21 to 23	0	0	25. 4	0	0	15. 5
23 to 25	0	4. 0	25. 5	0	4. 0	15. 9
Total pounds 1 to 2 years	0	240	8, 342	0	240	5, 330
Total number to 2 years	360	758	11, 507	360	740	7, 453

Concentrates

Calves raised for herd replacements develop better when given concentrates in addition to milk or milk substitutes. A grain mixture or calf starter should be offered as soon as the calf can be induced to eat it, usually at 7 to 10 days of age. Often it is necessary to help the calf start eating grain by rubbing a little grain on its nose after milk feeding and at other times of the day. Or, you



can place a small amount of grain in the calf's mouth or in the bucket immediately after milk feeding.

Most calves prefer rolled or crushed grain to ground grain. Calves that eat the largest amounts of grain during the early ages usually grow at the fastest rates.

Many kinds of grain mixtures for young calves, called calf starters, are sold. Some of these are in pellet form; some are ground meal. Because calves differ in their preference for meal or pellets, there is no advantage in either form.

The grain mixture should be palatable and provide energy, proteins, and minerals. Combinations of farm-grown grains and protein concentrates—oilmeals, for example—make suitable feeds for the calf.

The percentage of protein needed in the grain mixture depends on the other feeds in the ration. When calves are getting liberal or moderate quantities of milk with leafy, legume hay or early-cut mixed or grass hay, the grain mixture can consist entirely of farm-grown grains.

Calves getting the suggested limited quantities of milk or milk replacer need a grain mixture containing 14 to 16 percent of protein. The grain mixture should contain 20 percent of protein if whey is fed or if the calves are weaned from milk replacer before they are a month old. The grain mixture should be palatable and may contain some dried skim milk. You can add 10 percent of molasses to increase the palatability of starter feeds.

The amount of starter to feed depends on the condition and rate of gain desired. A suggested level of grain or starter feeding is given in table 1. Table 3 gives

TABLE 3.—*Grain mixtures for calves on limited milk or milk replacer*

Ingredients	Mixture		
	A[1]	B[2]	C[3]
	Parts	*Parts*	*Parts*
Cracked corn or similar grain	28	40	43
Oats, whole or crushed	30	30	22
Wheat bran or distillers' dried solubles	30	0	22
Soybean, linseed, or cottonseed meal	10	28	11
Salt (iodized in certain areas)	1	1	1
Bonemeal	1	1	1
Total	100	100	100

[1] Contains 15.5 percent of protein.
[2] Contains 19.6 percent of protein.
[3] Contains 15.0 percent of protein.

three grain mixtures that can be fed with milk or milk replacer suggested in table 1. When only poor-quality hay is fed, give calves a pound or two more than suggested in the table.

If it is more economical, feed a commercial starter until the calves are 2 to 3 months old. Then, substitute one of the suggested mixes or a similar mixture that is in use for other animals on the farm.

Grain feeding can be reduced when the calf is 6 months old. After they are 9 months old, calves need no grain if they are given all the good-quality hay or pasture they can eat. If forage is limited or of low quality, the heifers should continue to receive some grain.

Forages

Hay

Any variety of your best bright, leafy, early-cut hay is good for calves. Hay feeding should be started when the calves are 1 to 3 weeks old. At all ages thereafter, calves should be fed all the hay they will eat.

Most calves eat little hay until they are 4 to 6 weeks old. Put a handful or more of the most palatable hay in a rack for them. Place the rack where the calves can easily eat the hay but where they are unable to soil it. Feed calves and heifers all the good-quality hay they can eat.

Silages

Grass or legume silage is good for calves. The moisture content of the material placed in the silo determines the growth rate obtained when the silage is the only forage given.

- Unwilted silage—20 percent of dry matter—will produce little gain.
- Wilted silage—30 percent of dry matter—will produce moderate gain.
- Dry silage—50 percent of dry matter—will produce gains equal to those obtained from hay.

As with hay, quality of silage differs with the maturity of the crop when cut. Early-cut forage has the highest feeding value.

If you feed calves 1 to 9 months old 3 or 4 pounds of grain plus all the good, wilted silage that they will eat, they will grow as well as calves fed hay and grain. When they are older, calves fed only wilted silage grow less than those fed only hay. Supplement the silage with 4 pounds of grain per day or feed 1 part good hay with 3 parts silage.

Corn silage can be fed to calves of any age. However, it is lower in protein than hay or hay silages. Therefore, protein must be supplied by the remainder of the ration. Early-weaned calves, given 3 to 4½ pounds of a 20-percent-of-protein grain mix and corn silage, will gain as much as when fed hay. When little or no grain is fed with the silage, the growth will be less than when only hay is fed. It is usually advisable to feed some hay along with corn silage.

Pasture

Good pasture, properly managed, is an excellent feed for growing calves. Calves can be successfully reared from 7 to 10 days of age on excellent pasture and fed only milk or milk replacer. The quality and quantity of the pasture determine whether concentrate is needed. When pasture is excellent, calves need little or no grain. Calves of the large dairy breeds usually do better on pasture than calves of the small breeds.

Pasture for calves and young heifers should be the best avail-

able and should consist of immature, rapid-growing grasses and clovers. Such pasture is low in crude fiber and high in protein, carbohydrates, minerals, and vitamins.

A special calf pasture can be developed by using rotational or strip grazing. Or, the calves can be grazed ahead of the milking herd where rotational or strip grazing is practical. Calves can be kept free of most parasites if they are grazed rotationally on clean pastures.

Approximately normal rates of growth can be obtained in calves over 9 to 10 months of age on fair to good pasture without feeding concentrates. When the pasture becomes poor or dry, feed growing heifers a supplement of hay or grain. Water and shade should be available when calves and heifers are on pasture.

Other Feeding Needs

Water

Start providing calves free access to water when they are 3 or 4 weeks old. Offer some water immediately after feeding milk. Place a tub in the calf pen, or provide an automatic water cup. Young calves can be taught to use an automatic watering cup if you fill the cup by hand until they begin to use it.

Calves may drink nearly ½ pint of water daily at 3 weeks of age, 5½ quarts at 8 weeks, 13½ quarts at 4 months, and 19½ quarts at 6 months.

Minerals

Complicated mineral mixes are expensive and need not be fed. Calves fed adequate rations generally receive plenty of minerals, except salt. Salt should be provided as soon as the calf is old enough to eat hay or grain.

Add 1 pound of salt to each 100 pounds of grain mix or calf starter. When your calves are a month old, place salt or a salt block in a box where they can reach it.

Milk contains calcium and phosphorus; legume hays contain calcium; and protein supplements and mill-byproduct feeds contain large amounts of phosphorus. Grain mixtures containing about 15 percent of protein supplements or mill-byproducts contain sufficient phosphorus for calves. If the grain mix fed young calves consists only of farm-grown grains, add 1 pound of a phosphorus supplement—defluorinated phosphorus or steamed bonemeal—per 100 pounds of grain mix.

From 6 months to calving time, heifers can develop normally on a ration containing 0.16 percent of calcium. Legume hays contain 0.6 to 1.9 percent.

Timothy and other grass hays contain only 0.12 to 0.40 percent of calcium. Most cereal grains contain only 0.02 to 0.10 percent of calcium and 0.25 to 0.50 percent of phosphorus.

Forages contain 0.15 to 0.30 percent of phosphorus. Growing heifers at this age require about 0.25 percent of phosphorus in the diet after 6 months of age.

In many northern States, an iodine supplement is necessary. Feed iodized salt at the rate of 1 percent of the grain mix or feed it free choice in block form. Lack of iodine may cause "big neck," or goiter, in newborn calves. Or, they may be born weak or dead. Feeding iodized salt containing 0.007 percent of iodine during the gestation period prevents the deficiency.

Symptoms of cobalt deficiency are not definite. Animals that have this deficiency are unthrifty and thin and have little appetite,

a rough hair coat, and a rough appearance.

Feed trace-mineralized salt that contains cobalt or add 1 ounce of cobalt sulfate to each 100 pounds of salt.

Rapidly growing calves, fed liberal amounts of milk or nonfortified milk replacer and no other feeds for periods of 2 or 3 months, may have low levels of iron and magnesium in their blood. **For these deficiencies, feed salt containing iron or magnesium or both.**

Calves fed forage and grain get plenty of iron and magnesium in their ration.

Vitamins

Most of the vitamins calves need are supplied naturally by milk, good forage, or sunshine or are manufactured by the calf. Milk replacer fed to young calves should have vitamin A, D, and E supplements. Vitamin A usually is supplied by 1 to 2 pounds of good alfalfa hay. Calves should be eating this much hay when weaned from milk or milk replacer.

Young calves receive their first **supply of vitamins A and D in colostrum. Feeding colostrum for** 3 to 4 days supplies the calf with these vitamins and allows it to store any excess in its body for future needs.

Vitamin A is necessary for growth, health, and resistance to infections. Additional vitamin A above the required amount does not prevent infection. Carotene —a yellow pigment in green plants and carrots—is converted into vitamin A in the body. Usually, the greener the forage, the greater is its carotene content.

Vitamin A can be supplied to young calves by giving them cod liver oil. For this purpose only 1 to 2 teaspoons per day is necessary. Concentrates of vitamin A in oil or capsule form can also be used. Either of these is often used when a home-mixed milk replacer is given to calves.

Lack of vitamin D may slow growth and cause rickets or other improper bone development—joint soreness, stiffness when walking, straight pasterns, bowed legs, or arched back. Signs of rickets do not develop until calves are about 3 months of age. Calves obtain vitamin D when exposed to sunshine and when fed hay, silage, cod liver oil, or irradiated yeast.

Lack of vitamin E may cause muscular weakness or slowness, inability to consume milk or feed, and inability to get up. Calves fed excessive amounts of cod liver oil or kept on milk as the principal feed for 3 months or longer may develop these symptoms. Calves receive vitamin E from green feeds, grains, and protein supplements.

The calf's rumen will make the B vitamins needed. This begins by the time the calf is a few weeks old. You need not feed calves supplemental B vitamin concentrates. Using multiple vitamin capsules containing B vitamins plus vitamin A and D does not improve growth.

Antibiotics

Practically all commercially available milk replacers now contain an added antibiotic. Feeding an antibiotic to calves reduces scours and increases the amount of feed consumed and thus increases rate of growth. Feeding a calf antibiotics after it is 2 to 3 months of age is not profitable.

Antibiotics may also be used to cure and, sometimes, to prevent scours and other diseases. This use is discussed under "Diseases," page 18.

NORMAL GROWTH OF CALVES AND HEIFERS

Table 4 shows the weight and heart girth measurements of the dairy calf or heifer at monthly intervals up to 2 years of age. If you do not have a scale you can measure the heart girth with a tape to determine the approximate weight. This information will help you measure the progress of your herd replacements.

Breeding Age

Heifers that are adequately fed throughout the growing period can be bred at 15 to 16 months of age. They will be normal size or larger at calving time. Heifers that have been underfed before breeding will be below normal size at 2 years of age.

Heifers that are markedly under-sized at 15 to 16 months of age should not be bred until 18 or 19 months old. Do not delay breeding longer; if you do, cost of rearing the heifer is increased.

Care at Calving Time

The heifer should be growing and in good flesh at calving time. This is necessary so that she can produce milk at the most profitable level. Place the heifer in the cow herd about 6 to 8 weeks before she is due to calve. Feed her

TABLE 4.—*Normal heart girth measurement and weight of calves and heifers during the growing period*[1]

Age in months	Holstein		Ayrshire		Guernsey		Jersey	
	Inches	*Pounds*	*Inches*	*Pounds*	*Inches*	*Pounds*	*Inches*	*Pounds*
Birth	31	96	29½	72	29	66	24½	56
1	33½	118	32	98	31½	90	29½	72
2	37	161	35½	132	34½	122	32½	102
3	40¼	213	38¾	179	38	164	32¼	138
4	43½	272	42¾	236	41¼	217	38¼	181
5	47	335	45½	291	44¼	265	41½	228
6	50	396	48¼	340	47	304	44½	277
7	52½	455	51¼	408	49¾	362	47¼	325
8	54¾	508	53	447	51¾	410	49¾	369
9	57	559	55	485	53¾	448	51¾	409
10	58¾	609	57	526	55	486	53¼	446
11	60½	658	58	563	56¾	521	55	481
12	62½	714	59	583	58¼	549	56½	520
13	63¼	740	60¾	630	59¼	587	57½	540
14	64¼	774	62	666	60½	615	58½	565
15	65¼	805	63	703	61¾	640	59	585
16	66¼	841	64	731	62½	674	59¾	611
17	67¼	874	65¼	758	63½	696	60½	635
18	68½	912	66	781	65	727	61½	660
19	69¼	946	66½	813	65½	752	62½	687
20	70½	985	67½	841	66¼	780	63	712
21	71½	1,025	68½	885	67½	816	64	740

[1] Body weights for Holsteins and Jerseys from USDA Technical Bulletins 1098 and 1099. Heart girth measurements for these weights taken from Research Bulletin 194 (1960), Nebraska Agricultural Experiment Station. Weights and heart girth measurements for Ayrshires and Guernseys calculated from data furnished by Professor H. P. Davis, University of Nebraska.

4 to 6 pounds of grain daily and all the forage she will eat.

Before calving, let the heifer become accustomed to handling and procedures used in the milking herd. Always handle her gently and with kindness. Later milking habits of a cow are usually determined by the way she is handled at first calving.

MANAGEMENT

Housing

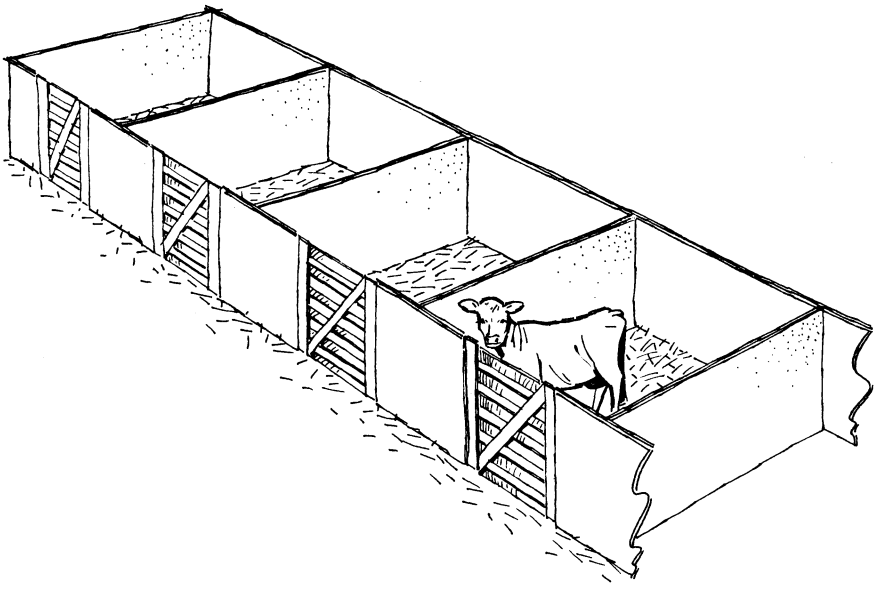
No matter what type of housing you provide, keeping calves dry and clean is the most important consideration.

Any housing arrangement should provide a hay rack, a grain box, and watering facilities. Arrange the racks so that calves can eat as much forage as they want.

Place each newborn calf in an individual pen or tie stall for the first month. After calves are a month old, you can house them in individual pens, tie stalls, or in groups. Each group should be made up of calves of similar ages.

Individual pens should be about 4 by 5 feet. Make the sides of concrete, solid boards, tempered hardboard, or slatted-board panels.

The floor should be concrete. If you do not want to change the bedding frequently, build a platform 2 to 4 inches above the concrete. To make this, you can use



expanded metal gratings, or slatted boards. Bed the platform heavily with straw or waste grass hay; add clean straw as necessary. Allow the litter to build up.

If you do not build a false floor, wood shavings or clean straw can be used as bedding. This litter must be changed frequently and not allowed to build up.

Wash and disinfect each pen when the calf is removed; allow the pen to dry. Keep each pen vacant for 2 days to a week before the next calf is placed in the pen.

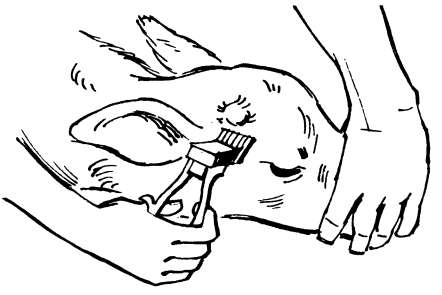
Stalls can be used to keep calves in until they are a few months old. These stalls need to be frequently cleaned and bedded.

Different open-shed arrangements can be used to house young calves. A desirable method is to build individual pens within the open shed. Runways can lead out into the open from each pen. Use slatted boards or net wire for dividing the runways. The floor size for each pen within a shed should contain from 25 to 50 square feet per animal, depending on its size.

Calves can be kept in pen sheds for as long as 7 months in cold climates. In the southern half of the United States, calves need little shelter.

Dehorning[1]

You can prevent horns from developing by using caustic soda or a dehorning paste on the small horn button within a few days after the calf is born.



[1] Detailed information on dehorning and marking cattle may be obtained from your county agricultural agent or the U.S. Department of Agriculture, **Washington, D.C., 20250.**

Marking

Mark each calf for identification before separating it from its mother. This can be done by using tattooing in the ear, eartags, neckstraps, or pictures. Tattooing is permanent but it is not satisfactory with breeds having dark-colored skin. Eartags should be placed on the upper edge of the ear about 1½ inches back from the base of the ear with the tag number on top.

A neckstrap may be made of leather, rope, chain, or plastic. Straps and tags occasionally get ripped off or lost. Therefore, you should have some other way to identify calves.

Breed associations may require one or more specific means of marking or identification.

Some herd owners use at least three of these identification methods on each calf. All information on identification should be recorded in a permanent record book.

Extra Teats

Many dairy calves have teats in addition to the four normally present. These extra teats usually are smaller and are not harmful. They do detract from the appearance of the developed udder. Occasionally they may se-

crete small amounts of milk and thus become a nuisance.

Remove the extra teats when the calf is young. This can be done anytime between 1 and 2 months of age. Wash and disinfect the area around the teat. Then, stretch the teat slightly and cut it off with clean, sharp scissors. There is usually little or no bleeding. Disinfect the cut area with iodine.

Diseases

Calves are susceptible to numerous ailments, many of which can be prevented by proper care and feeding. Prevention is more desirable and satisfactory than treatment. The advice of a veterinarian about the most effective means of treatment is often necessary. He should always be consulted in case of severe outbreaks of disease.

Scours

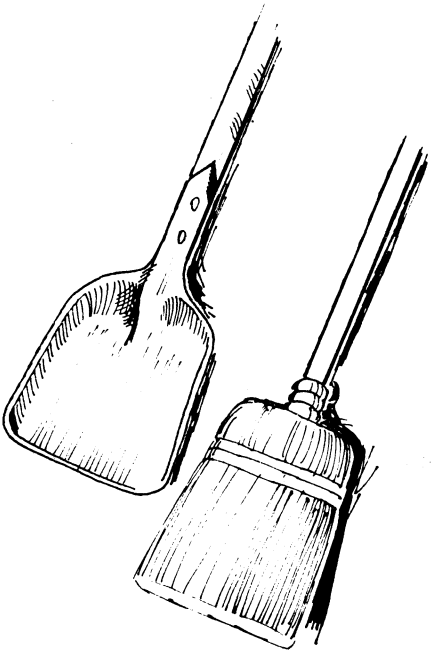
Scours, or diarrhea, occurs most frequently during the first 3 weeks of life. Infections or digestive upsets can cause scours. Calves may have infectious scours, noninfectious scours, or bloody scours.

The progress of infectious scours is rapid and causes a high rate of mortality. The source of infection can be through the navel or the mouth. Droppings are whitish, have on offensive odor, are soft to liquid in consistency, and are usually voluminous. The calf is listless and has little appetite. This type of scours is usually severe in its effect and the condition is often difficult to treat.

The condition is more frequent during the first 3 to 5 days of life than at later ages. Start treatment at the first signs of diarrhea. Treatment usually consists of giving a commercial medicine composed of kaolin or pectin, sulfa drugs, and an antibiotic. Reduce the calf's feed one-half and give it extra water.

Care spent in cleaning and disinfecting calf quarters will help prevent recurrence of scours. In severe outbreaks it may be necessary to clean, scrub, disinfect, and vacate the premises for a short period.

In herds where scours occurs frequently during the first few days of life, give calves an antibiotic immediately after birth. Then, move the calves to clean individual quarters.



Noninfectious scours may be caused by feeding with dirty utensils, overfeeding, feeding milk with too high a fat content, irregular feeding, or changes in environment or weather.

The symptoms and the progress are similar to infectious scours, but do not develop as severely or as rapidly. The treatment is the same.

When bloody scours persists, an infection known as coccidiosis should be suspected. Symptoms other than bloody droppings are rough hair coat, weakness, listlessness, nervousness, poor appetite, and little or no gain in weight. This condition occurs frequently when several calves run together in unclean pens. Calves get the infection by licking objects contaminated by manure.

Separating the calf from the accumulation of manure interrupts the life cycle of the protozoan and controls the disease. Moving calves to cleaned pens at weekly intervals also aids in controlling the disease.

Sulfa drugs—sulfaguanidine, and sulfathiazole—are used in treating coccidiosis.

Internal parasites also should be suspected when calves on adequate diets fail to grow and develop normally and no infectious cause can be found. These are stomach and intestinal worms. Take a stool sample to your veterinarian so that he can identify the parasite and recommend the correct treatment. Treatment for internal parasites usually differs with each parasite.

You can help prevent internal parasites by having clean cows, quarters, pens, and pastures.

Pneumonia

Any ailment that causes a weakened condition in the calf may help pneumonia to develop. Pneumonia often develops in calves that have scours, especially if they are not promptly treated. Rapid changes in temperature and drafts may lead to pneumonia in calves.

Calves that have pneumonia usually breathe rapidly, cough, have a high temperature, and little or no appetite. Because **pneumonia can be infectious and spread to other calves, new calves** should not be brought into quarters where pneumonia is prevalent.

Affected calves should be isolated and not allowed to contact other calves. **Sulfa drugs plus antibiotics are used for treating pneumonia.**

Calf Diphtheria

Calf diphtheria is caused by a germ that locates in the mouth, throat, and sometimes lungs of young calves. It causes a special type of infection. The control of this infection is similar to that of infectious diarrhea.

Symptoms of calf diphtheria are lessened appetite, drooling, sluggishness, and sometimes a cough. The treatment is usually successful if the proper drugs are used—certain sulfa drugs.

Ringworm

Ringworm is an infectious fungus growth. Animals with ringworm have circular areas on their skin that are scabby, crusty, and practically hairless. The ringlike area increases in size as the infection spreads. It appears more frequently in winter months when calves are closely housed.

Treatment of ringworm consists of scrubbing the affected area with soap and water, using a stiff brush, and then applying medication. The medication can be an ointment or tincture of iodine plus salicylic acid or some other antifungus compound.

Warts [2]

Warts usually disappear naturally without treatment as animals mature. Most 2-year-old cattle are wart-free. If you want to treat animals, you can tie off warts, apply medications, or ask your veterinarian to vaccinate.

Treatment reduces skin injury that would damage the hide, but it does restore skin to top condition.

Animals may require treatment if—

- Warts sap strength.
- Warts spread rapidly.
- Stumps become infected.

Insects and Related Pests [3]

Fleas, lice, ticks, and cattle grubs can be controlled by spraying or dusting with an insecticide.

Spraying is the best means of control.

For treating a few animals, use a cylindrical air-pressure or knapsack sprayer that holds 2 to 3 gallons. Shake such sprayers occasionally to assure a properly mixed spray.

If you want to use a power sprayer, operate the sprayer at a pressure of 100 to 200 pounds per square inch.

A time-saving way to protect a few calves from insects is to dust them by hand. Hand dusting takes only about ½ minute per animal. Apply a small handful to each animal. Dust it over the back and sides of the animal and rub it in lightly.

[2] Further information on warts in cattle may be obtained from your county agricultural agent or the U.S. Department of Agriculture, Washington, D.C., 20250.

[3] Further information on insects around cattle may be obtained from your county agricultural agent or the U.S. Department of Agriculture, Washington, D.C., 20250.

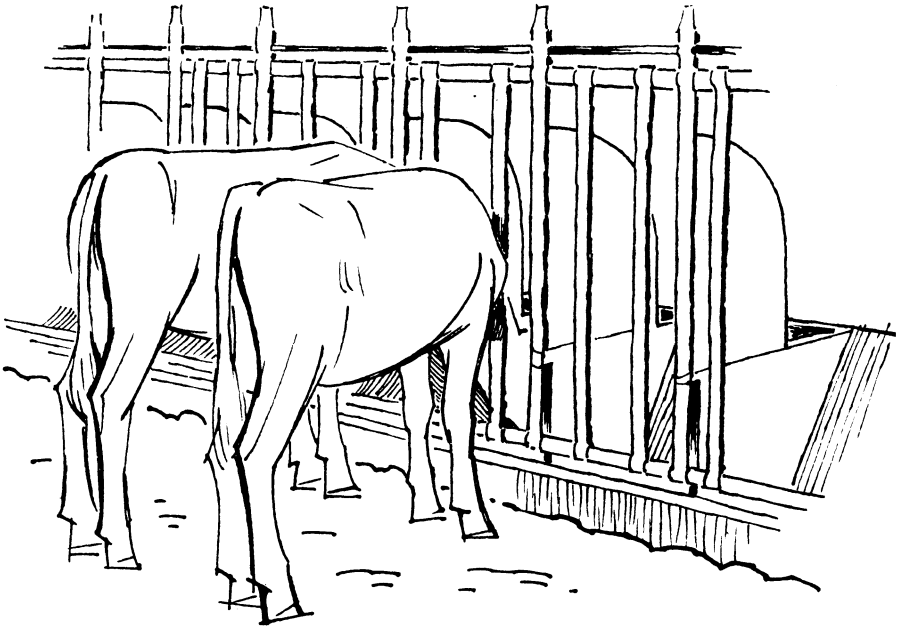
Lead Poisoning

Lead is responsible for many deaths in calves. Lead poisoning should be suspected any time a calf dies suddenly for no apparent reason, especially if a convulsion precedes the death. A careful search of the barn, pens, and pasture will often expose the source—discarded storage batteries, lead paint, and lead-containing sprays. Any painting in or around calf quarters should be done with non-lead paint.

PRECAUTIONS

Antibiotics.—Keep antibiotics and drugs in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and animals cannot reach them.

Insecticides.—If insecticides are handled or applied improperly, or if unused parts are disposed of improperly, they may be injurious to humans, domestic animals, desirable plants, and pollinating insects, fish, or other wildlife, and may contaminate water supplies. Use insecticides only when needed and handle them with care. Follow the directions and heed all precautions on the container label.



RAISING CALVES FOR VEAL

Dairy calves are sometimes raised for veal. Veal calves are usually marketed between 4 and 8 weeks of age. About 10 pounds of whole milk are required to produce 1 pound of gain.

Calves of the larger breeds are preferred for veal. Conformation, finish, and size determine the price. The preferred weight is 180 to 200 pounds. Calves over or under these weights usually sell for a lower price. For example, calves under 100 pounds are classed as lightweights and sell for 40 to 60 percent of the maximum veal price.

Calves being fattened for veal should be confined and their exercise kept to a minimum. To obtain best growth, they should be fed 3 or 4 times a day.

If you have a few milking cows and no good outlet for their milk, you may find it profitable to buy 3-day-old calves and use your cows as nurse cows. Veal calves also can be successfully fed from a bucket or nipple pail.

All calves raised for veal and not on a nurse cow should be fed an antibiotic to increase rate of gain and reduce diarrhea.

Start feeding at the levels recommended in table 1 for growing replacements. After 10 to 14 days of age, the amount can be gradually increased until the calves drink 20 to 25 pounds of whole milk daily.

Give milk, whole or skimmed, free choice to veal calves over 1 month old. Calves fed milk will gain 2.0 to 2.7 pounds per day between 3 and 60 days of age. The milk can be fed lukewarm or cool. It should be the same tem-

perature at each feeding and should be fed in clean utensils.

Milk replacers containing fat plus other additives can be used to raise good veal calves. The amount fed should be about double the amount suggested for raising herd replacements.

Veal calves can also be raised on a limited milk-grain ration. When fed limited amounts of milk, calves need about 6 pounds of whole milk per pound of gain plus grain. When a dry milk replacer is used in place of whole milk, feed 0.9 to 1.5 pounds plus about 1.0 pound grain for each pound of gain. Calves fed this way gain about 1 pound a day.

Raising Calves for Dairy Beef

Often male calves can be fed to 1 to 1½ years of age and marketed as dairy beef. They can be fed and reared using the same procedures as suggested for rearing herd replacements.

Dairy beef calves can be marketed as grass-fat animals. During the last 2 to 4 months of the feeding period they can be fed some concentrates to produce a more finished carcass. The amount of concentrates to feed depends on the rate of gain and degree of finish you want and the price of the concentrate.

Prepared by

ANIMAL HUSBANDRY RESEARCH DIVISION
AGRICULTURAL RESEARCH SERVICE

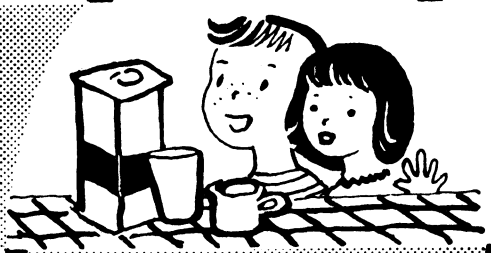
Washington, D.C.

Issued October 1961
Slightly revised September 1965

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C., 20402 - Price 15 cents

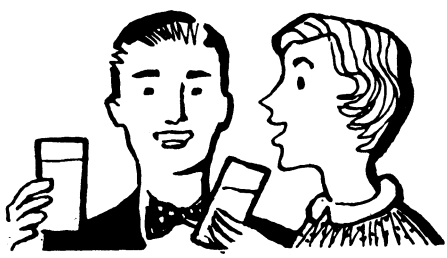
do you and your family get enough MILK each day?

children
3 to 4 cups



teen-agers
1 quart or more

adults
1 pint or more



MILK is one of our best foods . . .
. . . use MILK daily

For suggestions about ways to use milk in meals see Home and Garden Bulletin No. 57, Getting Enough Milk, available from the U.S. Department of Agriculture, Washington, D.C., 20250.

U.S. GOVERNMENT PRINTING OFFICE: 1965 O—783-883